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Part II

Environmental Protection Agency

Standards of Performance for New Stationary Sources; Metal Coil Surface Coating

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1629-2]

Standards of Performance for New Stationary Sources; Metal Coil Surface Coating

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: Standards of performance are proposed to limit emissions of volatile organic compounds (VOCs) from new, modified, and reconstructed metal coil surface coating operations. The proposed standards would limit VOC emissions to 0.28 kilogram per liter (kg/*l*) of coating solids applied for any prime or finish coat operation where low-VOC content coatings are used without a VOC capture system and emission control device. The proposed standards would limit VOC emissions to 0.14 kg/*l* of coating solids applied where higher VOC content coatings are used in conjunction with a VOC capture system and emission control device. As an alternative, the owner or operator would also be allowed to achieve compliance by demonstrating an overall VOC emission reduction of 90 percent or more prior to discharge to the atmosphere. The determination of average VOC content would be made for each calendar month for each affected facility. Reference Method 24 would be the reference method for determining the VOC content of coatings but the Administrator will allow the use of formulation data from the coating manufacturer except in cases where the validity of the formulation data is in doubt. Reference Method 25 would be used to determine the VOC concentration in the exhaust gas streams. Both reference methods were promulgated at 45 FR 65956, October 3, 1980.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that metal coil surface coating operations contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed coil coating operations to use the best demonstrated system of continuous emission reduction, when costs, non-air-quality health, and environmental and energy impacts are considered.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before March 6, 1981.

Public Hearing. A public hearing will be held on Febuary 4, 1981 beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by January 28, 1981 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate, if possible) to Central Docket Section (A-130), Attention: Docket Number A-80-5, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at OA Auditorium, R.T.P., North Carolina. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-533.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Metal Coil Surface Coating Operations, Background Information Document for Proposed Standards,* EPA-450/3-80-035a.

Docket. Docket No. A-80-5, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Section Chief, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to all new, modified, and reconstructed metal coil surface coating (coil coating) operations. Existing facilities would not be subject to the proposed standards unless they undergo a modification or a reconstruction as defined in 40 CFR 60.14 and 60.15. Compliance with the proposed standards could be achieved by any of three approaches for each affected facility. The owner or operator could use coatings whose average VOC content on a monthly basis is 0.28 kg/*l* of coating solids applied or less; or, the owner or operator could apply higher VOC content coatings if he reduces VOC emissions to 0.14 kg/*l* of coating solids applied or less; or, the owner or operator could comply by demonstrating an overall VOC emission reduction of 90 percent or greater prior to discharge to the atmosphere. These standards will be reviewed at 4-year intervals after their promulgation date.

The proposed standards would require each owner or operator to conduct monthly performance tests to demonstrate compliance with the proposed emission limits. Where coatings are used without a VOC capture system and emission control device to meet the proposed numerical limit of 0.28 kg/*l* of coating solids applied, the owner or operator would be required to calculate and record a weighted average of the VOC content of coatings applied (including dilution solvents) for each affected facility for each calendar month. Reference Method 24 would be used to determine the VOC content of coatings, but the Administrator will allow the use of manufacturer's formulation data for that purpose except where the validity of the formulation data is in doubt. For each affected facility, the owner or operator would be required to report each month for which the average VOC content of the coatings exceeded 0.28 kg/*l* of coating solids applied. These reports would have to be submitted within 10 days after the end of each such month.

Where higher VOC content coatings are used with a VOC capture system and emission control device to meet the proposed numerical limit of 0.14 kg/*l* of coating solids applied, the owner or operator would be required to calculate and record the weighted average of the VOC content (including dilution solvents) of coatings applied for each affected facility for each calendar month according to the equations contained in the proposed standards. The owner or operator would also have to calculate and record the overall VOC emission reduction required to meet the emission limit. In addition, during the first monthly test, the owner or operator would have to measure the actual overall VOC emission reduction achieved by the VOC capture system and emission control device. Reference

Method 25 and the equations provided in the proposed standards would be used for these determinations. Compliance would be demonstrated where the measured value of the actual overall VOC emission reduction is greater than or equal to the overall VOC emission reduction required to meet the emission limit. For each affected facility, the owner or operator would report each month for which the average VOC content of coatings applied, when reduced by the overall destruction rate of the VOC capture system and emission control device (as determined during the most recent measurement), exceeds the proposed numerical limit. These reports would have to be submitted within 10 days after the end of each such month.

Where compliance is achieved through the demonstration of a 90 percent overall reduction in VOC emissions, the owner or operator would conduct the first monthly performance test by using Reference Method 25 and the equations provided in the proposed standards to calculate the overall percent reduction achieved by the VOC capture system and control device. Compliance would be demonstrated where the overall percent reduction is equal to or greater than 90 percent. After the first monthly test, the owner or operator would monitor the operating parameters of the emission control device.

If thermal incineration is used, the owner or operator would be required to install and operate a device to continuously monitor and record the combustion temperature of the control device. The proposed standards would require the owner or operator to report quarterly all coating periods of more than 3 hours duration where the average combustion temperature fell 28° C (50° F) or more below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency. If catalytic incineration is used, the owner or operator would be required to install a device to continuously monitor and record the gas temperature both upstream and downstream of the incinerator catalyst bed. The owner or operator would report quarterly all coating periods in excess of 3 hours where the average difference between the temperatures upstream and downstream of the catalyst bed falls below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or where the average inlet (or upstream) temperature falls 28° C (50° F) or more below the inlet temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency.

Summary of Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of proposed standards of performance are normally expressed as incremental differences between the impacts of complying with the proposed standards and those for complying with a typical State Implementation Plan (SIP). Many existing metal coil surface coating operations are located in areas that are considered nonattainment areas for purposes of achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to have the same geographic distribution as existing plants. States are in the process of revising their SIPs for these areas. In revision SIPs, States generally consider the recommendations contained in Control Techniques Guideline (CTG) documents. The CTG applicable to this source category is *Control of Volatile Organic Emissions From Existing Stationary Sources*, Volume II, *Surface Coating of Cans, Coil, Paper, Fabrics, Automobiles and Light-Duty Trucks* (EPA–450/2–77–088 [CTG]). Although the CTG documents are published for guidance only and are not legally binding on the States, most States are expected to revise their existing SIPs in accordance with the CTG recommendations or to retain their existing limits on VOC emissions.

Approximately 70 percent of the existing coil coating plants are located in States that currently require VOC emissions to be reduced by at least 85 percent prior to discharge except for plants that use waterborne or other low-VOC content coatings. This emission limit is more stringent than the CTG recommendations, and it appears that these States plan to maintain this level of control for VOC emissions. The remaining plants are located in States that use a permit system for controlling VOC emissions. These States are expected to revise their implementation plans to require VOC emission reductions to the CTG-recommended level, which is equivalent to a 64 percent reduction in the emissions from the average industry solvent-borne coating formulation of 60 percent VOCs and 40 percent solids by volume.

The proposed standards would reduce VOC emissions from a typical plant by approximately 33 percent in those States that currently control VOC emissions by a numerical limit (85 percent reduction) and would reduce emissions from a typical plant by approximately 72 percent in those States that adopt the CTG-recommended level of control (64 percent reduction). Nationwide VOC emissions would be reduced by about 3,600 megagrams (Mg) per year by 1986 from a projected level of 12,500 Mg with no New Source Performance Standard (NSPS).

Little or no water pollution or solid waste impact from new, modified, or reconstructed coil coating plants is expected to result from application of the proposed standards. None of the control techniques used by the coil coating industry generates either liquid or solid waste and, therefore, the proposed standards would have no impact in these areas.

Nationwide energy usage by the coil coating industry totaled about 6,600 terajoules (TJ) in 1978. The proposed standards would result in an energy usage increase of about 1 percent per year, which is equivalent to 200,000 barrels of crude oil in the fifth year. Plants that are located in States requiring an 85 percent reduction and that achieve compliance through the use of higher VOC content coatings in combination with an incinerator could be expected to decrease their energy consumption by about 5 percent. However, for those plants regulated to the CTG-recommended level of control, compliance with the proposed standards through the use of incineration could result in up to a 50 percent increase in energy consumption in some individual plants if one of the more energy-efficient systems identified as being capable of achieving the CTG-recommended limits is used as the baseline. Little or no impact in energy consumption would be expected to result from the proposed standards for plants meeting the proposed emission limits with the use of waterborne or other low-VOC content coatings without the use of incineration.

The proposed standards could increase both the capital and annualized costs of new coil coating plants. Based on a predicted industry growth rate of 12 percent per year through 1985, the increased capital cost of new plants that locate in States requiring an 85 percent reduction in VOC emissions could range from $110,000 for a small plant to $140,000 for a large plant. This capital outlay represents an increase in the total capital cost of a new plant of approximately 0.9 percent for a large plant and 1.4 percent for a small plant. The increase in total annualized costs could range from $11,000 for a small plant to $23,000 for a large plant. For plants that locate in States that adopt the CTG-recommended limits, capital

costs for a new plant could increase by $180,000 for a small plant and by $920,000 for a large plant, 2.3 and 6.6 percent increases, respectively, in the total capital costs of a new plant. Nationally, the cumulative capital costs over the first 5 years could reach $20 million. Total annualized costs could increase by $55,000 for a small plant and by $395,000 for a large plant. On an industry-wide basis, the increase in total annualized costs in the fifth year could be $7 million. Compliance with the proposed standards could result in increases in the price of coil coated metal ranging from 0.2 percent for a large plant in 85 percent reduction areas to 4.1 percent for a large plant in States that adopt the CTG-recommended limits. The effects for other plant sizes fall between these two values. In the fifth year, the average price of coil-coated metal could have increased by 2.6 percent.

Rationale

Selection of Source and Pollutants

The "Priority List and Additions to the List of Categories of Stationary Sources," promulgated at 44 FR 49222 on August 21, 1979, ranked sources according to the quantity of emissions, endangerment of health and welfare, and the mobility and competitiveness associated with each source. The coil coating industry ranked 22nd on this list of 59 sources to be controlled for air pollutants. Recent studies conducted by and for EPA estimate that current emissions from the coil coating industry in 1978 amount to 12,700 Mg (14,000 tons) annually.

Although coil coating plants were identified in 27 States, most plants are concentrated around industrial centers in the Northeast and Midwest. A total of 109 individual coil coating plants containing an estimated 147 coil coating lines were identified during this study. Of these plants, 42 are known to be located in areas designated as nonattainment areas for ozone.

VOC emissions from individual plants vary widely as a consequence of the wide variations in annual production. Estimated annual emissions for 60 of the 109 coil coating plants were found to be listed in emission inventory files maintained by individual States. A total of 40 of the 60 plants were identified as having annual uncontrolled (or potential) emissions of greater than 90 Mg (100 tons) per year, and 12 of these 40 plants had annual uncontrolled (or potential) emissions of greater than 900 Mg (1,000 tons) per year. Emission data for some coil coating plants are not contained in the emission inventory files, both because some States do not include companies with potential emissions of 45 Mg (50 tons) per year or less and because many of the coil coaters are captive operations in other industries that are identified by their major end products.

In the coil coating industry, VOC emissions result from the evaporation of organic solvents from the applied coating during the drying process. Typical coatings applied to coiled metal strip include epoxies, epoxyacrylics, acrylics, and polyester enamels. These coatings generally contain organic solvents such as ketones, esters, ethers, and aromatics. Coil coatings are applied in two main steps: prime coat and finish coat. Prime coat and finish coat operations both contribute to VOC emissions.

VOCs are the major air pollutants emitted from the coil coating industry. Particulate matter emitted from this industry is minimal. Technology is currently available to reduce VOC emissions from coil coating operations. The use of higher VOC content coatings with incineration or low-VOC content coatings was identified as having the potential for reducing nationwide industry emissions by as much as 46 percent from all new, modified, and reconstructed sources. Consequently, the coil coating industry has been selected for regulation of VOC emissions by new source standards of performance.

Selection of Affected Facilities

The choice of the affected facility for this standard is based on the Agency's interpretation of Section 111 of the Act, and judicial construction of its meaning.* Under Section 111, the NSPS must apply to "new sources"; "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" [Section 111(a)(3)]. Most industrial plants, however, consist of numerous pieces or groups of equipment which emit air pollutants, and which might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, which is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole were "modified." If, on the other hand, each piece of equipment were designated as the affected facility, then as each piece was replaced, the replacement piece would be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. The application of these factors is discussed below.

The metal coil coating process is a continuous operation that begins with a roll or coil of bare sheet metal and ends with a roll or coil of sheet metal that has a surface finish on one or both sides. A typical coil coating line consists of an inlet station, where the metal strip is unrolled from the coil and enters the process; a metal cleaning and pretreatment section, where the metal is prepared for the coating application; a coating section, which may consist of a single coating station and curing oven or may consist of a prime coating station and curing oven and a finish coating station and curing oven; and an exit station, where the finished metal strip is repackaged into a roll or coil.

Significant quantities of VOC emissions are generated from the application and curing of each prime coat and each finish coat on the metal strip. The application and curing of each coating is accomplished by three devices in series: a coating application station, a curing oven, and a quench station. Existing reports on industry studies indicate that, of the total VOC content of the coatings, approximately 90 percent evaporates in the ovens, 8 percent evaporates at the application station, and about 2 percent evaporates during the quench operation.

Consideration was given to the following alternatives in the selection of affected facilities for proposed

*The most important case is *ASARCO, Inc. v. EPA*, 578 F.2d 319 (D.C. Cir. 1978).

regulation: (1) including all of the coating operations on a coil coating line (from unwind to rewind) as a single affected facility; (2) designating each application station, oven, and quench station as separate facilities; and (3) treating each coating operation—consisting of the application station, oven, and quench station—as separate affected facilities.

The first alternative, consideration of all coating operations on the line as a single affected facility, was rejected because of the diversity of coating formulations used throughout the industry. A large segment of the industry coats metal coil according to the needs or specifications of the purchaser or owner of the metal. In some cases, a low-VOC content (waterborne) prime coating may be followed by a higher VOC content finish coating. In such a situation, if the low-VOC content coating has emissions much lower than the limit required, the reduction required for the emissions from the higher VOC content coating would be less than optimum because the emissions from both coatings would be considered in combination. A similar situation could occur if a modification resulted in a decrease in emissions from one coating application and an increase in emissions from the other coating application. The net result may be no change in emissions if the entire line is considered a single affected facility, and the line would not become subject to the NSPS. This could lead to higher emissions than the case where the best system of control is used on each emission source. Therefore, this alternative was rejected.

Consideration was also given to treating each application station, oven, and quench station as separate affected facilities. However, the operations are so closely associated, both physically and operationally, that their treatment as separate affected facilities appears inappropriate. Many modern coil coating lines have the coating station enclosed in a room so that a large fraction of the emissions occurring during application of the coating is captured by the flow of air into the ovens. The quench station is also located immediately adjacent to the oven. Emission test data in existing reports of industry studies indicate that VOC emissions at the quench station may account for up to 2 percent of total emissions. However, a large fraction (and possibly all) of these emissions is captured by the flow of ventilating air into the oven. Designation of the quench station as a separate affected facility would require the application of an emission limit, method of control, and compliance testing for any fugitive emissions that escape from the quench area. Because of the close relationship among the three emission points and the fact that all of the emissions come from the same coating, this alternative was concluded to be impractical. Therefore, this alternative was rejected.

The third alternative is the designation of each coating operation—consisting of a coating application station, a curing oven, and a quench station—as separate affected facilities. This alternative would provide plant owners or operators with flexibility in their choice of coating formulations, and compliance with the proposed standards could be achieved by different techniques for each coating application. Therefore, each prime coat operation and each finish cost operation have been selected as the affected facilities for control in the proposed standards of performance.

The proposed standards would apply to each prime coat operation and each finish coat operation on all new, modified, or reconstructed coil coating lines and would include emissions that result from the use of VOCs (solvent) as a dilution agent. Cleanup operations may entail equipment flushing or cleaning. The cleanup solvent is typically recovered by a commercial recovery facility. The proposed standards would not include VOC emissions that result from the use of solvent in cleanup operations or activities that do not generate VOC emissions, such as metal cleaning, pretreatment, pickling, galvanizing, and physical handling of materials. Although some fugitive emissions from paint mixing stations may occur, the quantity of these emissions is considered insignificant and would not be subject to the proposed standards.

Although some flashoff occurs between the coating applicator rolls and the oven, the flashoff area is not considered a separate operation but, instead, part of the application process. Most coil coating lines have two separate coating sections—one for the application and curing of the prime coat and another for the application and curing of the finish coat. These lines are referred to as tandem lines and would contain two affected facilities. Lines that apply a one-coat finish to the metal and, consequently, have a single coating section are considered as a single affected facility. One coil coating line was identified that uses electrodeposition (EDP) to apply a prime, coat, followed immediately with a wet-on-wet application of the finish coat by conventional roller coating. Both coats are then cured simultaneously by a single oven. Because of the wet-on-wet application and the single curing oven, this type of operation would be considered a single affected facility.

Controls Technologies

The normal technique by which coatings are applied in the coil coating industry is roll coating. In this technique, a roller, wet with the coating, contacts the moving metal strip and transfers the coating to the metal surface. A major advantage of this application technique is that the transfer efficiency consistently approaches 100 percent. Because of this characteristic, applied coating solids are assumed to be equal to consumed coating solids for all coatings. In coil coating operations, prime and finish coats may be applied to one or both sides of the metal in one or two applications. After the prime coat application, the strip generally passes through an oven, where the prime coating is dried and cured; after the finish coat application, the metal strip passes through an oven, which dries and cures the finish coatings. Air is passed through the ovens to carry off the volatile solvent vapors that are released when the volatile portion of the applied coatings evaporates. This exhaust gas stream, in combination with the exhaust gas streams from the application and quench process, is the source of VOC emissions to the atmosphere. It is these gas streams that are treated when emission control devices are installed.

There are two general techniques for reducing VOC emissions from coil coating operations. The first is to pass the exhaust gas stream through a VOC emission control device, and the second is to reduce the amount of VOCs in the coating.

The only emission control device that has been identified as effective in controlling VOC emissions from coil coating operations is an incinerator. Both thermal and catalytic incinerators have been successfully used in the industry. The results of seven emission tests indicate that thermal incinerators can achieve greater than 95 percent reduction in VOC emissions when they are operated at temperatures of 760° C (1,400° F) or greater; however, large amounts of supplemental fuel are frequently required to raise the exhaust gases from oven temperatures in the range of 260° to 426° C (500° to 800° F) to incineration temperature. If heat recovery units are installed along with the incinerator, the energy consumption can be dramatically reduced. The recovered heat can be used to produce steam or hot water for the wet section of the line or to preheat the oven air. In many existing installations, the use of a

thermal incinerator with heat recovery has resulted in an overall energy savings relative to a coil coating line with no emission control.

Thermal incinerators were identified in several configurations. In some configurations, the internal oven burners are replaced with incinerators (zone incinerators) that pull air and VOC's from the oven atmosphere, burn the VOC's and exhaust directly back into the oven to supply both heat and "cleaned" oven ventilating air. These units reportedly reduce VOC emissions by 50 to 70 percent and reduce the amount to external oven ventilation needed. An external incinerator can be used in conjunction with the zone incinerators to further reduce VOC emissions. When this is done, the external incinerator can be smaller that when and external incinerator is used alone because the volume of external oven ventilation required is reduced. The zone incinerators are not widely used without an external after burner because alone they may not achieve compliance with the numerical limits of existing SIPs, and, in some cases, may not achieve adequate odor control. Other configurations of incinerators use a single external incinerator and return a portion of the incinerator exhaust back to the oven to supply heat. These units are used with various forms of additional heat recovery systems, such as regenerative or recuperative units that heat the oven exhaust before it enters the incinerator and remove heat from the incinerator exhaust before it is returned to the oven.

Vendors of catalytic incinerators indicate that these devices are also capable of achieving VOC emission reductions in excess of 95 percent, and their use requires substantially less energy than the thermal incinerator because of the lower incineration temperature. If heat recovery is used in conjunction with the catalytic units, they become even more attractive economically. However, literature and industry sources also indicate that there are restrictions on the applicability of catalytic incinerators because many of the coatings used in the coil coating industry contain ingredients that may foul or mask the catalyst. If this happens, the active catalyst life is greatly reduced, resulting in higher operating costs for the incinerator because of the more frequent catalyst replacement. Consequently, the use of catalytic incinerators is normally restricted to those plants that use only a few different coating formulations in which the ingredients are accurately known. Plants of this type are usually captive coaters.

Although carbon adsorption has been used to control VOC emissions from many industrial processs, none was identified on coil coating operations. The high temperature of the oven exhaust has been cited by industry sources as the reason that these systems are not used in coil coating. For this reason, carbon adsorption systems were not described in the Background Information Document (BID) as a control technique for the coil coating industry, although their use would not be precluded if desired by the plant owner or operator.

When control devices are used to reduce VOC emissions, capture efficiency must also be considered. Capture efficiency in excess of 95 percent is achievable by the judicious application of hoods and/or enclosures at the coating application station.

Industry has estimated that 90 percent of the VOC emissions from coil coating operations occur in the oven. Of the remaining 10 percent, 8 are emitted at the coating application station, and 2 are emitted in the quench area. During the background study for these proposed standards, a number of coil coating lines were observed in which the coating application stations were enclosed in coating rooms. The normal design practice for these rooms has oven ventilating air entering from the side of the room opposite the oven. The oven ventilating air then flows across the room, the coating application equipment, and the wet metal strip before entering the oven. The installation of a hood that extends from the oven entrance over the wet metal strip to the coating application equipment further contains the VOCs emitted in the coating application station. This hood, when properly placed as close to the wet metal strip as feasible, helps direct the oven make-up air drawn from the coating room through the coating application equipment and over the wet metal strip. Although all coating room ventilation air cannot normally be used as oven make-up air, EPA's study of coating room air flow indicates that the pattern of air flow normally used would entrain almost all of the VOCs emitted at the coating application station. Coating rooms were determined to be applicable at all new, modified, and reconstructed coil coating plants.

When the coated metal coil exits the oven, it is immediately cooled at the quench station. Because of the enclosed nature of the quench operation and its proximity to the oven exit, most of the quench area VOC emissions are entrained in the ventilating air that passes through the quench area into the exit end of the oven. By drawing oven ventilation air from the coating room and quench area in this manner an overall capture efficiency of at least 95 percent is achievable.

Low-VOC content coatings include organosols, plastisols and other high-solids coatings, waterborne coatings, and powder coatings. Some of these low-VOC content coatings are successfully used in coil coating processes, but their use is generally restricted to certain specialized applications. Organosols and plastisols are used to coat some products, but their use is not expected to expand to general applications because they are costly and because thin film thicknesses are difficult to achieve with high speed application equipment. Radiation cured waterborne coatings are also in limited use in the industry. However, installations known to use radiation cured coatings are restricted to single coat processes, and the single coat process is not expected to have more general applications in the foreseeable future.

Waterborne coatings are the most widely used low-VOC content technology in the industry. Approximately 15 percent of all coil coating is currently done with waterborne coatings. However, waterborne coatings are limited in their application because they have not been developed with the wide range of finish characteristics that is needed for the many products for which coil coated metal is used. Data submitted by coating manufacturers indicate that the VOC content in the waterborne coatings now used by the industry ranges from 0.07 to 0.54 kg/l of solids and that most are in the range of 0.11 to 0.28 kg/l of solids. Several manufacturers indicate that, within the next 5 to 8 years, the VOC content of most waterborne coatings could be reduced to the range of 0.10 to 0.18 kg/l of solids. The use of waterbornes is expected to increase in proportion to the general growth of the industry, but their use is not expected to expand rapidly into areas where solvent-borne coatings are now required. Although waterborne coatings cannot be considered a universal control technique for all coil coating operations, they have proved effective in some installations. Therefore, incineration and waterborne coatings have been determined to be the most widely applicable control techniques for all segments of the industry. Based on the use of these control techniques, the following five regulatory alternatives were considered. These alternatives

differ from those in the BID and are based on new data submitted by the industry at the National Air Pollution control Techniques Advisory Committee (NAPCTAC) meeting.

Regulatory Alternatives

Regulatory Alternative I is no NSPS for prime coat and finish coat operations in the coil coating industry (no NSPS). Under this alternative, VOC emissions from the coating process would be controlled through existing and revised SIPs.

Regulatory Alternative II is an overall VOC emission reduction of 85 percent, or an emission limit equivalent to an 85 percent overall reduction in the emissions from the average coating formulation used by the industry. Based on data obtained from coil coaters and from coating manufacturers, the average coating formulation is estimated to consist of 40 percent solids and 60 percent VOCs by volume. Regulatory Alternative II (85 percent) is based on the use of an incinerator with up to a 95 percent destruction efficiency and a capture efficiency of at least 90 percent.

Regulatory Alternative III is different from that described in the BID and is similar to Regulatory Alternative II, with the addition of a separate emission limit for users of low-VOC content coatings. This alternative is an overall VOC emission reduction of 85 percent, or an emission limit equivalent to an 85 percent overall reduction in the emissions from the average industry coating formulation when higher VOC content coatings are used in conjunction with an emission control device. When low VOC content coatings are used without an emission control device, this alternative would require that emissions be limited to the equivalent of an 80 percent reduction in the emissions from the average industry coating formulation.

Regulatory Alternative IV is similar to Regulatory Alternative III in the BID but has a slightly less stringent capture requirement. This alternative is an overall VOC emission reduction of 90 percent, or an emission limit equivalent to a 90 percent overall reduction in the emissions from the average coating formulation used by the industry. Regulatory Alternative IV (90 percent) is based on the use of an incinerator with up to a 95 percent destruction efficiency and a capture efficiency of 95 percent of VOC emissions.

Regulatory Alternative V is similar to Regulatory Alternative IV, with the addition of a separate emission limit for users of low-VOC content coatings. This alternative is an overall VOC emission reduction of 90 percent, or an emission limit equivalent to a 90 percent overall reduction in the emissions from the average industry coating formulation when higher VOC content coatings are used in conjunction with an emission control device. When low-VOC content coatings are used without an emission control device, this alternative would require that emissions be limited to the equivalent of an 80 percent reduction in the emissions from the average industry coating formulation.

Environmental, Energy, and Economic Impacts

The environmental impact of each regulatory alternative was computed as the VOC emission reduction that could be achieved relative to the emissions allowable under existing and projected State regulations. A study of the geographic distribution of existing coil coating plants revealed that 70 percent of the plants are located in States that impose numerical limits on VOC emissions. On the average, these States require that VOC emissions be reduced by 85 percent prior to their discharge to the atmosphere, except for plants that use waterborne or other low-VOC content coatings. The remaining 30 percent of existing plants are located in States that use a permit system to control VOC emissions.

States are currently revising their SIPs for nonattainment areas. To evaluate the impacts of the regulatory alternatives, a baseline level of control must be established from which the impacts can be calculated. Because of the revisions that are being made in the SIPs, a choice had to be made between the use of the existing SIP requirements and the revised SIP requirements as the baseline level of control. Because many of the coil coating plants are located in nonattainment areas, it is expected that many States that now use the permit system will adopt the emission limits recommended by the CTG on coil coating operations even though the CTG document does not legally bind the States. This recommended limit is 0.31 kg VOC/l of coating minus water (0.48 kg/l of coating solids) and is equivalent to a 64 percent reduction in the emissions from the average industry coating formulation. It is further anticipated that those States that already have numerical limits in their SIPs will continue to impose those limits. Therefore, these two baselines—an 85 percent reduction for 70 percent of the plants and the CTG-recommended limits for 30 percent of the plants—were used to estimate the environmental impact of the regulatory alternatives for the proposed NSPS. Inherent in the estimates are the assumptions that plants that become subject to the proposed NSPS will have the same geographic distribution as existing plants and that all plants now covered by a permit system will be subject to the CGT-recommended limits.

Regulatory Alternative I, no NSPS, would have no impact on VOC emissions from coil coating operations. A total of 70 percent of existing plants would continue to reduce emissions by 85 percent prior to their discharge or use low-VOC content coatings, while the remaining 30 percent would be subject to revised SIP regulations based on the CTG-recommended limits. The current or baseline level of VOC emissions from existing plants would be maintained. Total VOC emissions from new and existing plants located in States imposing numerical limits are estimated to be about 6,500 Mg in the fifth year, a 58 percent increase from current levels of 4,100 Mg. VOC emissions from plants located in States subject to revised SIP regulations based on the CTG-recommended limitations would also increase approximately 58 percent from the current emission level of 3,800 Mg per year to 6,000 Mg per year. Total nationwide emissions in the fifth year are expected to be about 12,500 Mg.

Regulatory Alternative II would have no effect relative to Alternative I on the VOC emissions from new and modified plants that locate in States that now impose numerical limits and use higher VOC content coatings and incineration. In the absence of any additional standards, some plants would use currently available low-VOC content coatings. It is unlikely that these plants would be able to meet the emission limit of Regulatory Alternative II by using these coatings alone. If it is assumed that these plants would switch to higher VOC-content coatings and incineration, their VOC emissions would be reduced by about 70 MG (75 tons).

Alternative II would result in an average reduction of 30 percent from new and modified plants that locate in States that adopt the CTG-recommended limits. Emission reductions from plants that use higher VOC content coatings and incineration would amount to 1,800 Mg (2,000 tons), and emission reductions from plants that use low-VOC content coatings would amount to about 25 Mg (30 tons) if they switched from low-VOC content coatings to higher VOC content coatings and incineration. The fifth year impact on overall emissions would amount to a reduction of 1,900 Mg (2,100 tons) relative to the baseline levels. In this case, total emissions in the fifth year would decrease to 10,600 Mg (11,700

tons) from the baseline level of 12,500 Mg (13,800 tons).

Regulatory Alternative III would have no impact on the VOC emissions from plants in areas that now impose numerical limits but would lead to a reduction of 1,800 Mg (2,000 tons) relative to the baseline from plants in areas that adopt the CTG-recommended limits. Total emissions in the fifth year would decrease to 10,700 Mg (11,800 tons) from the baseline level of 12,500 Mg (13,800 tons).

An NSPS based on Regulatory Alternative IV would result in an average 33 percent reduction relative to the baseline in the emissions from new and modified plants that locate in States that now impose numerical limits and an average 72 percent reduction from new and modified plants that locate in States that adopt the CTG-recommended limits. The effect of these reductions on overall emissions in the fifth year would amount to a decrease of approximately 3,600 Mg (4,000 tons). Emissions in the fifth year would decrease from 12,500 Mg (13,800 tons) to 8,900 Mg (9,800 tons).

An NSPS based on Regulatory Alternative V would reduce emissions the same as Regulatory Alternative IV for plants that use higher VOC content coatings and incineration but would result in an increase in emissions, relative to Regulatory Alternative IV, of approximately 400 Mg (400 tons) in the fifth year from plants that use waterborne coatings. The overall emission reduction in the fifth year would amount to 3,200 Mg (3,500 tons). Emissions in the fifth year would decrease from the baseline level of 12,500 Mg (13,800 tons) to 9,300 Mg (12,300 tons).

Each of the regulatory alternatives is based on the use of incineration as the primary means of VOC emission control. Incinerators do not generate either solid or liquid wastes, and, consequently, no impact on water pollution and solid waste disposal is expected to occur from either of the regulatory alternatives when incineration is used. If compliance is achieved by the use of low-VOC content coatings, no changes in liquid or solid waste discharge would be expected.

Energy Impacts

To estimate the energy impacts of the regulatory alternatives, specific control systems were defined that could be used to achieve compliance with existing regulations and with the regulatory alternatives. The equipment identified as being capable of meeting the CTG-recommended limits is an energy efficient system that consists of a series of incinerators inside the ovens that recycles the hot exhaust gases back to the oven. This system is not widely used at present without an external afterburner. The control technology identified as capable of achieving compliance with the numerical limits of existing SIPs and to achieve the numerical limits of the regulatory alternatives when higher VOC content coatings are used is incineration with a VOC destruction efficiency of 95 percent used in conjunction with up to a 95 percent capture efficiency. The control technology identified as being capable of achieving the numerical limits established for low-VOC content coatings is the use of waterborne coatings.

Regulatory Alternative I would have no impact on energy consumption compared to current levels. New plants that locate in States requiring an 85 percent reduction would continue to consume in the range of 27 TJ/yr for small plants to 170 TJ/yr for large plants. Plants that locate in States subject to revised SIP limitations would continue to consume from 17 TJ/yr in small plants to 120 TJ/yr in large plants. In the fifth year, total energy consumption by the industry is estimated to increase by about 3,500 TJ over current levels.

Regulatory Alternative II would have very little effect on fuel consumption for plants that locate in States that now impose numerical limits; fuel and electrical energy consumption would remain at about the current level of 27 to 170 TJ per year for small and large plants, respectively. For plants that locate in States imposing the CTG-recommended limits, fuel consumption could increase in a range from 42 percent for a large plant to 60 percent for a small plant. In a small plant, annual natural gas consumption would increase from a current usage of 13.6 million ft^3 to 21.2 million ft^3. For a large plant, annual natural gas consumption would increase from a current usage of 96 million ft^3 to 136 million ft^3. The increase in electrical energy consumption could range from 38 percent for a large plant to 58 percent for a small plant. For a small plant, annual electrical energy consumption would increase from 760,000 to 1.2 million kilowatt-hours (hWh). For a large plant, annual consumption would increase from 5.2 to 7.2 million kWh. The overall impact on national energy consumption is estimated to be the equivalent of 40,000 barrels of crude oil per year, or 1 percent relative to the baseline case. The fifth year impact would be an increase equivalent to 200,000 barrels of crude oil per year or 5 percent relative to the baseline.

The energy impacts of Regulatory Alternative III would be the same as those of Regulatory Alternative II for individual plants, but fewer plants would be affected because more plants could comply with the standard by using low-VOC content coatings for which there is no energy impact. The overall energy impacts of the two alternatives are about the same because no more than 15 percent of the plants would have a change in their energy impact as a result of this alternative.

Regulatory Alternative IV would have very little effect on fuel consumption for plants that locate in States that now impose numerical limits. There could be up to a 5 percent decrease in fuel consumption as a result of the assumed improvement in the capture efficiency of VOC emissions. No increase in electrical energy consumption is estimated for the plants in numerical limit areas. For plants that locate in States that adopt the CTG-recommended limits, the effect of Regulatory Alternative IV on fuel consumption could range from a 34 percent increase for a large plant to a 50 percent increase for a small plant. In a small plant, annual natural gas consumption would increase from the current usage rate of 13.6 million ft^3 to 20.0 million ft^3. for a large plant, annual natural gas consumption would increase from a current usage of 96 million ft^3 to 128 million ft^3. The effect on electrical energy consumption for plants in areas that adopt the CTG-recommended limit would be an increase in the range of 38 percent for a large plant to 58 percent for a small plant. For a small plant, annual electrical energy consumption would increase from 760,000 to 1,200,000 kWh. For a large plant, annual consumption would increase from 5.2 to 7.2 million kWh. The overall impact on national energy consumption is estimated to be the equivalent of 40,000 barrels of crude oil per year, or 1 percent relative to the baseline case. The fifth year impact would be an increase equivalent to 200,000 barrels of crude oil per year, or 5 percent relative to the baseline.

The energy impacts of Regulatory Alternative V would be the same as those for Regulatroy Alternative IV for individual plants, but fewer plants would be affected because more would be able to meet the standards by using low-VOC content coatings. The overall energy impact would be about the same for both alternatives.

Economic Impacts

A discounted cash flow approach was used to analyze the model plant costs and to determine the price impacts of each of the regulatory alternatives. The analysis was based on data consisting of the capital, installation, operating, and maintenance costs of the control equipment that could be used to achieve compliance with each of the baseline levels of control and with each of the regulatory alternatives. The cost data were obtained from coil coaters and from the vendors of coating equipment and emission control equipment for the coil coating industry.

Regulatory Alternative I, no NSPS, would have no economic or price impacts on plants located in States imposing numerical limits or on plants subject to revised SIP limitations based on the CTG-recommended limits. Current total installed capital costs for a new plant located in a State imposing numerical emission limits are estimated as $7.6 million for a small plant and $14.7 million for a large plant. Total annualized costs range from $4.2 million for a small plant to $11.0 million for a large plant. For a plant located in an area subject to revised SIP regulations based on the CTG-recommended limits, total installed costs range from $7.5 million for a small plant to $13.9 million for a large plant, and total annualized costs range from $4.2 million to $11.8 million for small and large plants, respectively.

Regulatory Alternatives II and III would have no impact on product price for plants that locate in States that currently impose numerical limits on VOC emissions. For plants that locate in States that adopt the CTG-recommended limits, the estimated price increase under Regulatory Alternatives II and III ranges from 1.0 to 3.9 percent for small and large plants, respectively, if the plants use higher VOC content coatings and incineration. This price impact represents increased installed capital costs in the range of $70,000 (about 1 percent) for a small plant to $780,000 (about 5 percent) for a large plant and increased total annualized costs in the range of $32,000 (about 1 percent) for a small plant to $380,000 (about 4 percent) for a large plant.

Alternatively, if prices are held constant, the return on investment (ROI) of a typical plant would decrease from the baseline level of 12 percent by an amount ranging from 0.38 percentage point for small plants to 2.70 percentage points for large plants that locate in areas that adopt the CTG-recommended limits. There could be no impact for plants in numerical limit areas. The 12 percent baseline ROI is the after-tax, weighted average cost of capital from equity, debt, and preferred stock. Financial data from 29 individual firms for 1978 were used to calculate this value. (For a full discussion of the derivation of this figure, see chapter 8 of the BID.)

The difference in the economic impacts between Regulatory Alternatives II and III occurs because fewer plants incur a cost under Regulatory Alternative III than under Alternative II. If a plant were forced to switch from the use of low-VOC content coatings to higher VOC content coatings and incineration to meet the requirements of Regulatory Alternative II, the economic impact would be the same as those described above. The number of such plants is indeterminate but would be no more than 15 percent of all new, modified, and reconstructed plants. Under Regulatory Alternative III, it is assumed that no plants would switch from waterborne coatings.

The economic impact of Regulatory Alternatives IV and V would be the same on plants that use higher VOC content coatings and incineration and would be relatively small for plants that locate in States that now impose numerical limits on VOC emissions. The price increase for these plants in estimated to range from 0.2 percent for a large plant to 0.8 percent for a small plant. The increase in the total installed capital costs of these plants ranges from $110,000 (about 1 percent) for a small plant to $140,000 (about 1 percent) for a large plant, and the increase in total annualized costs would be in the range of $11,000 (less than 1 percent) for a small plant to $23,000 (less than 1 percent) for a large plant. For plants that locate in areas that adopt the CTG-recommended limits, the impact of an NSPS based on Regulatory Alternatives IV or V would be a price increase in the range of 1.9 percent for a small plant to 4.2 percent for a large plant if the plants use higher VOC content coatings and incineration. The increase in the total installed cost of a new plant locating in these areas would be in the range of $180,000 (about 2 percent) for a small plant to $920,000 (about 6 percent) for a large plant. The increase in total annualized costs would be in the range of $55,000 (about 1 percent) for a small plant to $390,000 (about 4 percent) for a large plant.

If prices are held constant, the ROI of a typical plant would decrease from the baseline level of 12 percent by an amount ranging from 0.7 percentage point for a small plant to 2.4 percentage points for large plants that locate in areas that adopt the CTG-recommended limits and by an amount ranging from 0.1 to 0.3 percentage point for large and small plants, respectively, that locate in numerical limit areas.

Nationally, the average price increase of coil coated metal could be expected to increase by about 3.1 percent if an NSPS were promulgated based on Regulatory Alternative IV and by 2.6 percent if an NSPS were based on Regulatory Alternative V. The price increase for Regulatory Alternative IV is based on the assumption that plants would not be able to meet the emission limits by using low-VOC content coatings but, instead, would switch to higher VOC content coatings and incineration. The price increase for Regulatory Alternative V is based on the assumption that 15 percent of the new and modified plants would use low-VOC content coatings.

As can be seen from the above discussion, the price impacts, relative to the baseline, of Regulatory Alternatives II through V are relatively small for plants that locate in States that already impose numerical limits on VOC emissions. The impacts are higher for plants that locate in States that adopt the CTG-recommended limits, but the estimated impacts are probably an overstatement of the actual impacts because a number of plants already operate incinerators and coating rooms for reasons other than emission regulations. Costs in these situations would not be attributable to the proposed standards. The differences between the impacts of Alternatives II, III, IV, and V are small. The impacts of each alternative are concluded to be reasonable.

Selection of Best System of Continuous Emission Reduction

Regulatory Alternatives IV and V are estimated to reduce emissions in the fifth year by 3,900 and 3,200 Mg, respectively, relative to the emissions under Regulatory Alternative I. This amount is 1,400 to 2,100 Mg greater than the reduction that would be achieved by Regulatory Alternative II or III. There are no adverse environmental impacts from any of the regulatory alternatives, which leads to a conclusion that Regulatory Alternatives IV and V are the most reasonable from an environmental standpoint.

The energy impacts of Regulatory Alternatives II through V on plants that locate in States that adopt the CTG-recommended limits might be considered large (up to a 58 percent increase relative to Alternative I); however, a low-cost, energy-efficient system of control was used as the

baseline from which the impacts are estimated. Numerous contacts with the coil coating industry revealed that few such systems are in use in existing plants. The energy impact on plants that locate in areas that impose numerical limits on VOC emissions is quite small and may even be positive. The energy impact of Alternative IV or V relative to Alternative II or III may be positive, which makes Alternatives IV and V appear to be the more reasonable choices in view of the greater reduction in VOC emissions that they achieve.

The greater emission reduction associated with Regulatory Alternatives IV and V relative to Alternatives II and III is achieved with only a small increase in the economic impact compared to Alternative II or III. The differential increase in the total installed capital costs and total annualized cost for Regulatory Alternative IV or V (1 to 6 percent increase) over these costs for Regulatory Alternative II or III (0 to 5 percent increase) are relatively small. Price increases attributed to Regulatory Alternatives IV and V are in the range of 0.2 to 4.1 percent, while the corresponding increases attributed to Regulatory Alternatives II and III range from 0.0 to 3.9 percent. This is a differential price increase of 0.2 percent over the range of plant sizes studied. These additional impacts appear reasonable relative to the additional reduction in emissions that is achieved, which again makes Regulatory Alternatives IV and V appear to be the best candidates for the best system of continuous emission reduction.

A comparison of Regulatory Alternatives IV and V shows that Alternative IV produces an additional emission reduction of 700 Mg (or 22 percent) in the fifth year relative to Alternative V, which makes Alternative IV the better choice for environmental considerations. The energy and economic impacts of both alternatives are the same for individual plants, but Alternative V is estimated to affect about 15 percent fewer plants than Alternative IV, which makes Alternative V the more attractive choice from energy and economic considerations. Data submitted by coating manufacturers indicate that many of the waterborne coatings used by the coil coating industry would not meet the emission limit in Alternative IV, which could force new, modified, and reconstructed plants to abandon the use of low-VOC content coatings. However, coating data indicate that most commonly used waterborne coatings could meet a higher emission limit than would be allowed for these coatings under Regulatory Alternative V, which implies that no shifts away from low-VOC content coatings are likely under this alternative. There are some advantages to the use of low-VOC content coatings over the use of incineration systems. The overall energy requirement for low-VOC content coatings is lower than that for higher VOC content coatings and incineration because of the lower volume of oven ventilation required for low-VOC content coatings. Additionally, EPA has for a number of years encouraged the development and use of low-VOC content coatings as a means of reducing VOC emissions and EPA does not wish to preclude the use and further development of these coatings by setting an emission limit that cannot be met by their use. These considerations make Regulatory Alternative V more reasonable than Regulatory Alternative IV.

In view of the above assessment of the environmental, energy, and economic impacts, the large emission reductions that would be achieved, and the reasonable energy and economic impacts relative to these reductions, Regulatory Alternative V appears to be the most reasonable choice as the best system of continuous emission reduction. Regulatory Alternative V has therefore been selected as the basis for the proposed new source standards of performance. This alternative has been determined to be affordable, and the environmental, energy, and economic impacts have been determined to be reasonable.

Selection of Format for the Proposed Standards

A number of different formats were considered for the proposed standards. The format selected must be compatible with all of the control methods or systems that would be used to comply with the proposed standards, such as the use of low-VOC content coatings or the use of higher VOC content coatings coupled with an incinerator. The formats considered were emission limits expressed in terms of the VOC concentration in exhaust gases, mass of emissions per unit of production, mass of emissions per unit of coating solids applied, and an overall percentage emission reduction.

Typically, concentration standards are preferred over mass standards because mass standards require more measurements and conversion calculations. Exhaust gas flow rates and raw material or product flow rates have to be measured, and concentration measurements have to be converted to mass measurements. Where incineration is used as a control technique, there is a potential for air dilution. Excess air is used in incinerators to ensure complete combustion, and the quantity of excess air used can vary. Due to the potential for air dilution, correction factors are necessary to ensure that measurements of emissions from all control devices are referenced to the same basis and that the quantity of VOCs emitted is the same no matter how much excess air is used. If incinerators are used, correction factors referencing all calculations to a specific oxygen concentration level in the exhaust gases are a solution to the problem of using varying quantities of excess air. These factors, however, do not compensate for indirect air dilution resulting from combustion of more fuel and air than is necessary. In any event, a concentration standard would require a measurement of exhaust oxygen concentration. For these reasons, this format was not selected for the proposed standards.

For an emission limit expressed in terms of mass of VOCs per unit of production, compliance is relatively simple to demonstrate when low-VOC content coatings are used but is more difficult with the use of emission control devices. For low-VOC content coatings, the VOC content of the coatings used would be determined and multiplied by the volume of coatings used over a given time period. This value would then be divided by the production during that same time period to give the VOC emissions per unit of production. When emission control devices are used, stack tests would be necessary in addition to the determination of the VOC content of the coating to determine VOC emissions. The emissions over a period of time could then be divided by the production over the same period of time to yield the VOC emissions per unit of production. This format would not be very flexible in accommodating the large variations that exist in the VOC and solids content of the coatings used by the industry and the range of coating thicknesses that are used to meet the requirements of the many end products for which coil coated metal is used. This format could also penalize those coaters who, for reasons of product performance, must use a coating with a high VOC content or must use an above-average coating thickness. Therefore, an emission limit expressed in terms of mass of VOCs per unit of production was rejected as the format for the proposed standards.

An emission limit expressed in terms of VOC emissions per volume of coating solids applied overcomes the problems associated with the first two formats.

Because roller coating is the method of application, transfer efficiency is nearly 100 percent, which eliminates the need to consider this parameter explicitly in the compliance procedures. Stack testing would not be required unless emission control devices were used, and this format is compatible with all of the control methods that might be used. The difficulty with this format lies with the selection of the level of the emission limit, because the range of VOC content varies widely in the many different coating formulations used by the industry. To allow the use of coatings with varying VOC contents, a level would have to be selected that would permit compliance when coatings are used with the higher levels of VOC content. Such a limit may not achieve optimum VOC emissions control for coaters that use coatings with average or lower VOC content.

A format requiring an overall percentage reduction overcomes the problem with varying VOC content of the coatings but is not as compatible with compliance by the use of low-VOC content coatings as is the format of VOC content per unit of coating solids applied. However, the combination of this format with an emission limit expressed in terms of mass of emissions per unit of coating solids applied would allow the plant owner or operator to decide which method of compliance is most compatible with the VOC content of the coatings applied in his plant. Therefore, this combined format was selected for the proposed standards. This format has all of the advantages associated with the third format (mass of emissions per unit of coating solids applied) and does not penalize those coaters who must use coatings with a high VOC content because they are allowed to demonstrate the required percentage reduction in overall emissions.

Selection of Emission Limits

Section 111(a)(1) requires the emission limits to reflect "application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111(a)(1). The "best technological system" defined by Section 111(a)(1) is one that is not "exorbitantly costly." *Essex Chemical Corp.* v. *Ruckelshaus,* 486 F.2d 427, 433 (D.C. Cir. 1973).

Application of the "best technological system" results in a three-step standard: for coatings with VOC contents of 1.4 or more kg/l of coating solids, the standard is 90 percent reduction in VOC emissions. For coatings with VOC contents of .28 to 1.4 kg/l of coating solids, the standard is .14 kg VOC/l of coating solids. For coatings with VOC contents below .28 kg/l of coating solids, the standard is .28 kg/l.

As discussed earlier, VOC reductions of 90 percent are achievable by systems of capture and control. However, the cost and energy requirements of achieving VOC emission reductions varies according to the VOC content of the coating being controlled. The lower the VOC content of the coating, the higher are the cost and energy requirements of achieving a given reduction in emissions. This is for two reasons. First, control of lower VOC coatings generally requires capture and control systems of the same size and cost as control of higher-VOC coatings, but it achieves less emission reduction because there is less VOC to be controlled. Second, the cost and energy requirements of controlling lower-VOC coatings in incinerators are further increased by the need to use additional supplemental fuel to operate the incinerator.

In the Administrator's judgment, the cost and energy requirements of a capture and control system that achieves a 90 percent reduction are reasonable on coatings with VOC contents of 1.4 or more kg/l of coating solids. Such a control system is therefore the "best technological system" and the standard for such coatings is 90 percent reduction.

For coatings with VOC contents between .28 and 1.4 kg/l of coating solids, the standard is .14 kg VOC/l of coating solids. In the Administrator's judgment, the cost and energy requirements of achieving significantly greater emission reduction on these coatings would be exorbitant. Therefore, the "best technological system" for these coatings is one that can achieve .14 kg VOC/l of coating solids.

For coatings with VOC contents below .28 kg/l of coating solids, the standard is .28 kg VOC/l of coating solids. That is, no capture and control system is required on these coatings. This emission limitation reflects the Administrator's judgment that the cost and energy requirements of using any add-on control and capture system to control such coatings would be exorbitant.

Modification Considerations

The history of steady growth by the coil coating industry has lead many owners and operators of coil coating lines to look for ways of increasing their production capacity. Because the lead time to construct a new coil coating line is often as long as 2 years, more expedient means of increasing production capacity were developed. Many coaters have found that the design speed of existing coil coating lines can be increased by replacing or modifying the drive motors, electrical controls, or both. This increased speed is often achievable without modifications to the ovens because of improvements that occur in coating technology. This method of increasing production has played an important part in the growth of the coil coating industry to date and is expected to continue to play an important part in future industry growth. When accompanied by a capital expenditure, such changes to increase the design speed of coil coating lines would subject an existing coil coating line to the proposed standards if VOC emissions increase. There are no technological reasons why one of the control techniques on which the proposed standards are based—incineration with heat recovery and low-VOC content coatings—cannot be applied to existing coil coating lines that undergo a modification or reconstruction. The use of incineration with heat recovery as a retrofit on existing lines is well documented in the literature. To exclude these lines from the requirements of the proposed standards would be to exclude a large portion of projected industry growth. This fact, when considered with the feasibility of retrofitting, leads to the conclusion that it is reasonable to apply the proposed standards to all capital expenditure modifications for increasing the design speed of a coil coating line that results in an increased VOC emission rate. The impacts of the proposed standards are reasonable as applied to modified and reconstructed facilities.

Method of Determining Compliance

The two most likely methods of compliance with the proposed standards are the installation of emission control devices or the use of low-VOC content coatings. Because of the variations that exist in emission control systems and in the physical configurations of coil coating lines, the exact procedure used in determining compliance may vary from plant to plant. Generally, each owner or operator of a new, modified, or reconstructed coil coating plant must begin conducting performance tests within the first 6 months of operation. Following is a summary of the major requirements for determining compliance with the proposed standards:

(1) Where low-VOC content coatings are used to achieve compliance with the proposed numerical emission limit (0.28 kg/l of coating solids applied), the plant owner or operator must conduct monthly performance tests that consist of a calculation of a weighted average of the VOC content (including dilution solvents) per liter of coating solids for each prime coat and for each finish coat operation for each calendar month of operation. Equations are provided for calculating the weighted average. The data necessary to calculate the average VOC content of the coatings may be obtained from formulation data supplied by the manufacturer of the coatings or, in cases where the validity of the formulation data is in doubt, through a coating analysis performed with Reference Method 24.

(2) Where higher VOC content coatings are used with an emission control device to meet the proposed numerical emission limit (0.14 kg/l of coating solids applied), the owner or operator must conduct monthly performance tests that consist of a calculation of a weighted average of the VOC content (including dilution solvents) of the coatings applied for each prime coat and each finish coat operation for each calendar month according to the equations provided. The owner or operator must also calculate the overall VOC removal efficiency required to meet the emission limit and, during the first monthly performance test, must measure the actual overall VOC destruction rate achieved. If incineration is used, the latter value is determined by measuring the concentration of VOCs in the effluent gases in and out of the control device and to the atmosphere and by then calculating the overall control efficiency with the equations provided in the proposed standards. If carbon adsorption is used, the actual overall VOC removal efficiency is determined by a material balance performed with the equations provided in the proposed standards. Compliance is demonstrated where the measured value of the overall VOC removal rate is greater than or equal to the required overall VOC removal rate. If incineration is used, the operating temperature of the control device must be measured and recorded during the measurement of incinerator efficiency. Subsequent to the first monthly performance test, compliance is demonstrated if the computed overall VOC destruction rate required is less than or equal to the overall VOC destruction rate measured during the most recent measurement of incinerator efficiency. The measurement of the VOC destruction rate of the incinerator must be repeated when directed by the Administrator or when the owner or operator elects to operate the control device at conditions that are different from those during the most recent measurement.

(3) Where compliance is achieved through the demonstration of a 90 percent overall emission reduction, the owner or operator must conduct the first monthly performance test with the equations provided in the proposed standards and Reference Method 25 to determine the overall percent reduction of the control device. Compliance is demonstrated where the overall percent reduction is equal to or greater than 90 percent. The operating temperature of the control device must be measured during the test. In subsequent months, if the operating temperature of the control device is maintained within specified intervals of the temperature measured during the most recent measurement of incinerator efficiency, compliance is demonstrated. The test of the efficiency of the control device must be repeated when directed by the Administrator or when the owner or operator elects to operate the control device at conditions that are different from those during the most recent measurement.

(4) During the first monthly performance test for a capture system and incinerator one must be able to measure all of the potential emissions, both fugitive emissions and those ducted to the incinerator. To do this, all fugitive emissions from the coating application area must be captured and vented through stacks suitable for testing. Prior to the performance test for incineration-controlled affected facilities, the owner or operator will be required to construct a temporary total enclosure around the coating application station for the purpose of capturing fugitive VOC emissions. A total enclosure is defined as any structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions. If a permanent total enclosure exists on the line prior to the performance test, and the enforcing agency is satisfied that the enclosure is totally capturing fugitive emissions, the construction of a temporary enclosure is not required.

Two types of violations may occur at a source that achieves compliance through the use of incineration in conjunction with higher VOC content coatings. The first is an increase in the average VOC content of the coatings. The second type of violation would involve improper operation and maintenance of the control device. These two types of violations are discussed below.

When incineration is used to achieve compliance with the numerical limits of the proposed standards, the first monthly performace test consists of determining the weighted average VOC content of all coating formulations applied for a calendar month and of measuring the overall VOC destruction rate of the incinerator. The overall VOC destruction rate measured during that test will determine the maximum allowable average VOC content of coatings that can be used by the source. The VOC content must not exceed a value that, when reduced by the measured overall VOC destruction rate of the incinerator, is less than or equal to the numerical emission limit. If, during any subsequent monthly performance test, the average VOC content exceeds the allowable level (as determined by the most recent measurement), the source would be considered in violation. If an owner or operator wishes to increase the VOC content above the allowable level (as determined by the most recent measurement), he must demonstrate, by conducting another measurement that the overall VOC destruction rate of the incinerator is sufficient to meet the proposed standards with the higher VOC content coatings.

The second type of violation would involve a recurring pattern of temperature fluctuations lasting for 3 hours or more during the coating process. Although the proposed standards would require the owner or operator to report each such occurrence and its duration, the temperature drop in itself would not necessarily be considered a violation; however, repeated incidents may indicate improper operation and maintenance of control equipment, a violation of 40 CFR 60.11(d). If a source's continuous monitor shows repeated drops in temperature, the Administrator may require that a test of the overall VOC destruction rate of the incinerator be conducted at the lower temperature. If the test shows a violation of the standard, the plant may be cited for improper operation and maintenance of the control device and would be required to increase the operating temperature to that at which compliance was demonstrated.

A source that achieves compliance with the proposed standards through the use of Low-VOC content coatings without the use of emission control devices must determine a weighted average of the VOC content of the

coatings applied for each calendar month. Each of these calculations or measurements would be considered a performance test. Therefore, each measurement or calculation that results in an average VOC content greater than 0.28 kg/l, as averaged over the calendar month, would be a violation.

Performance Test Methods

Reference Method 24, "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings," provides the data necessary for a determination of the VOC content of coating material measured as mass of volatile organics per volume of coating solids. For prime coat and finish coat operations, Reference Method 24 could used to determine the VOC content of the coating material. The Administrator may at any time require that Reference Method 24 be used, but generally he will allow the owner or operator to obtain these data from the coating formulator or from company records, in which case Reference Method 24 would be retained as the reference method for verification when there is cause to doubt the validity of the formulation data. The method by which the VOC concentration is to be measured in the gas streams is Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon." The method by which the volumetric flow rate of stack gases is to be measured is Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," as described in 40 CFR Part 60, Appendix A. During all measurements performed with Reference Method 25, the operating temperature of the control device must be measured for use as a standard against which the operating temperature during subsequent operations may be compared.

Selection of Monitoring Requirements

Monitoring requirements are generally included in standards of performance to provide a means for ensuring proper operation and maintenance of emission control systems and to provide plant and enforcement personnel with sufficient data to determine compliance with the proposed standards.

Although continuous monitoring of total VOC emissions may be considered technically feasible, there are substantial technical problems and questions associated with this procedure, and it would also involve a significant expense to the industry for equipment and manpower. When incineration is used to achieve compliance with the proposed standards, operating parameters can be used to monitor VOC removal once the effectiveness of the system is demonstrated.

The proposed standards would require the plant owner or operator to measure the incinerator temperature parameters during each measurement of the overall VOC destruction rate of the incinerator. Monitoring would then consist of recording the temperature parameters on a continuous basis. Recording devices for these parameters are normally installed on coil coating lines for process control and would, therefore, require no additional expenditures. For thermal incinerators, the plant owner or operator would also be required to report on a quarterly basis all periods in excess of 3 hours during which the average temperature of the incinerator is more than 28° C (50° F) below the combustion temperature for which compliance was demonstrated. For catalytic incinerators, the plant owner or operator would be required to report, on a quarterly basis, all coating periods in excess of 3 hours during which the difference between the upstream and downstream temperatures fall below 80 percent of the difference at which compliance was demonstrated or during which the upstream temperature falls more than 28° C (50° F) below the temperature at which compliance was demonstrated. In addition, for those facilities that use thermal incineration, continuous daily records of the incinerator temperature must be maintained at the source. For those facilities using catalytic incineration, the plant owner or operator would be required to maintain continuous daily records of the gas temperature, both upstream and downstream of the catalyst bed, since a decline in the temperature difference between the inlet and exhaust would be indicative of a reduction in catalyst activity.

In addition, each plant owner or operator that uses higher VOC content coatings in combination with an incinerator or that uses low-VOC content coatings without an incinerator to comply with the numerical limit specified in the proposed standards would be required to calculate for each calendar month a weighted average of the VOC content of coatings applied for each affected facility. For each affected facility, the plant owner or operator would be required to report each calendar month of operation following the first compliance test where the numerical limit was exceeded. These reports would have to be submitted within 10 days after the end of each such month.

Impact of Reporting Requirements

A reports impact analysis for the metal coil surface coating industry was prepared in response to the U.S. Environmental Protection Agency (EPA) guidelines for implementing Executive Order 12044 (44 FR 30988, May 29, 1979). The purpose of the analysis is to estimate the economic impact of the reporting and recordkeeping requirements that would be imposed by the proposed standards and by those appearing in the General Provisions of 40 CFR Part 60. Included in the analysis are the rationale for the selection of the proposed requirements, and evaluation of the major alternatives considered prior to the selection required by the General Provisions and by the proposed standards. A copy of the reports impact analysis is included in Subcategory II–I of the metal coil surface coating docket (EPA Docket No. OAQPS A–80–5).

Based on the reports impact analysis, a total of 23 industry person-years would be required to comply with the recordkeeping and reporting requirements through the first 5 years of applicability.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see the ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for Metal Coil Surface Coating was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the test methods.

Comments are specifically requested on the definition of the affected facility that is contained in the proposed standards. Any comments submitted to the Administrator on the definition of the affected facility should contain specific information and data pertinent to an evaluation of the magnitude and severity of the impact of the current proposal and suggested alternative courses of action that would avoid this impact.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area where ambient pollutant concentrations exceed the National Ambient Air Quality Standards (NAAQS) must reduce emissions to the level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable New Source Performance Standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. BACT must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants that will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIPs) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIPs must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Documents.

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart TT as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

* * * * *

Subpart TT—Standards of Performance for Metal Coil Surface Coating

Sec.

60.460 Applicability and designation of affected facility.
60.461 Definitions.
60.462 Standards for volatile organic compounds.
60.463 Performance test and compliance provisions.
60.464 Monitoring of emissions and operations.
60.465 Reporting and recordkeeping requirements.
60.466 Test methods and procedures.

Authority: Sections 111 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 7411, 7601(a)], and additional authority as noted below.

Subpart TT—Standards of Performance for Metal Coil Surface Coating

§ 60.460 Applicability and designation of affected facility.

(a) The provisions of this subpart apply to the following affected facilities in a metal coil surface coating line: each prime coat operation, each finish coat operation, and each prime and finish

coat operation combined when the finish coat is applied wet on wet over the prime coat and both coatings are cured simultaneously.

(b) This subpart applies to any facility identified in paragraph (a) of this section that commences construction, modification, or reconstruction after ———— (date of publication in Federal Register).

§ 60.461 Definitions.

(a) All terms used in this subpart not defined below are given the same meaning as in the Act or in Subpart A of this part.

"Coating" means any organic material that is applied to the surface of metal coil for decorative or protective purposes.

"Coating application station" means that portion of the metal coil surface coating operation where the coating is applied to the surface of the metal coil. Included as part of the coating application station is the flashoff area between the coating application station and the curing oven.

"Curing oven" means the device that uses heat or radiation to dry or cure the coating applied to the metal coil.

"Finish coat operation" means the coating application station, curing oven, and quench station used to apply and dry or cure the final coating(s) on the surface of the metal coil. Where only a single coating is applied to the metal coil, that coating is considered a finish coat.

"Metal coil surface coating operation" means the application system used to apply an organic coating to the surface of any continuous metal strip that is packaged in a roll or coil.

"Prime coat operation" means the coating application station, curing oven, and quench station used to apply and dry or cure the initial coating on the surface of the metal coil.

"Quench station" means that portion of the metal coil surface coating operation where the coated metal coil is cooled, usually by a water spray, after baking or curing.

"VOC content" means that quantity, in kilograms per liter of coating solids, of volatile organic compounds (VOCs) in a coating as applied to metal coil.

(b) All symbols used in this subpart not defined below are given the same meaning as in the Act and in Subpart A of this part.

C_a = the VOC concentration in each effluent gas stream leaving the control device and entering the atmosphere, in parts per million by volume.

C_b = the VOC concentration in each effluent gas stream entering the control device, in parts per million by volume.

C_f = the VOC concentration in each effluent gas emitted directly to the atmosphere, in parts per million by volume.

D_{ci} = density of each coating as applied, in kilograms per liter.

E = the overall VOC destruction rate of the capture system and control device.

ER = the required overall VOC destruction rate.

G = the monthly average VOC content per unit of coating solids applied, in kilograms per liter.

k = the number of coating formulations applied.

L_{ci} = the volume of each coating applied, in liters.

L_o = volume of solids in coatings applied, in liters.

N = weighted average of mass of VOCs per volume of solids, after the control device.

$$\frac{\text{kg VOCs}}{\text{liter of solids}}.$$

l = the number of effluent gas streams entering the control device from one affected facility.

n = the number of effluent gas streams leaving the control device and entering the atmosphere.

m = the total number of effluent gas streams entering the control device.

M_o = total mass of VOCs consumed in a calendar month, in kilograms.

M_r = total mass of VOCs recovered from a affected facility during a calendar month, in kilograms.

p = the number of effluent gas streams emitted directly to the atmosphere from one affected facility.

Q_a = the volumetric flow rate of each effluent gas stream leaving the control device and entering the atmosphere, in dry standard cubic meters per second.

Q_b = the volumetric flow rate of each effluent gas stream entering the control device, in dry standard cubic meters per second.

Q_f = the volumetric flow rate of each effluent gas stream emitted directly to the atmosphere, in dry standard cubic meters per second.

V_{oi} = the proportion of solids in each coating as applied, by volume.

W_{oi} = the proportion of VOCs in each coating as applied, by weight.

§ 60.462 Standards for volatile organic compounds.

(a) On and after the date on which the initial performance test required by § 60.8 has been completed, each owner or operator subject to this subpart shall not cause to be discharged into the atmosphere more than:

(1) 0.28 kilogram VOC per liter (kg VOC/*l*) of coating solids applied for each calendar month for each prime coat or finish coat operation without the use of emission control device(s); or

(2) 0.14 kg VOC/*l* of coating solids applied for each calendar month for each prime coat or finish coat operation by using emission control device(s) operated at the most recently demonstrated overall efficiency; or

(3) 10 percent of the VOCs applied for each calendar month for each prime coat or finish coat operation (90 percent emission reduction).

§ 60.463 Performance test and compliance provisions.

(a) Paragraphs 60.8(d) and (f) do not apply to the performance test procedures required by this subpart.

(b) Each owner or operator of an affected facility shall conduct a performance test for each calendar month for each affected facility according to the procedures in this section.

(c) Where compliance with the numerical limit specified in § 60.462(a)(1) or (2) is achieved through the use of low-VOC content coatings without an emission control device or through the use of higher VOC content coatings in conjunction with an emission control device, the owner or operator shall compute and record a weighted average of the VOC content per volume of coating solids applied for each calendar month. The owner or operator shall obtain the data necessary to compute the weighted average through information provided by the formulator of the coating material or, if there is any doubt as to the validity of the formulation data, through the analysis of each coating, as applied, with Reference Method 24. Coating and solvent usage data may be obtained from company records. The owner or operator shall compute the average VOC content of coatings applied by the following equations:

(1) The total mass of VOCs consumed shall be computed with the following equation:

$$M_o = \sum_{i=1}^{k} W_{oi} D_{ci} L_{ci}.$$

(2) The total volume of solids consumed shall be computed with the following equation:

$$L_s = \sum_{i=1}^{k} V_{si} L_{ci} .$$

(3) The average VOC content shall be computed with the following equation:

$$G = \frac{M_o}{L_s} .$$

(d) Where compliance with the numerical limit specified in § 60.462(a)(1) is achieved through the use of low-VOC content coatings without emission control devices, compliance is achieved where the value of the VOC content per unit of coating solids applied (G) is less than or equal to 0.28 kg/l for each affected facility.

(e) Where compliance with the numerical limit specified in § 60.462(a)(2) is achieved through the use of higher VOC content coatings in conjunction with an emission control device that destroys VOCs, the owner or operator shall determine and record, in addition to the average VOC content per volume of coating solids applied, the required overall VOC destruction rate and, during the first monthly test, the actual overall VOC destruction rate of the control device according to the following procedures.

(1) The required overall VOC destruction rate is calculated with the following equation:

$$ER = \frac{G-0.14}{G} ,$$

(2) The actual overall VOC destruction rate is calculated with measured values of the VOC concentration and volumetric flow rate of each gas stream entering and leaving the control device and of each gas stream emitted directly to the atmosphere by the following equation:

$$E = \frac{\sum_{i=1}^{\ell} (C_{bi} \times Q_{bi}) - \sum_{i=1}^{n} (C_{ai} \times Q_{ai})}{\sum_{i=1}^{m} (C_{bi} \times Q_{bi})}$$

$$\sum_{i=1}^{\ell} (C_{bi} \times Q_{bi}) + \sum_{i=1}^{p} (C_{fi} \times Q_{fi})$$

(i) The owner or operator of the affected facility shall construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.466(a)(2).

(ii) The owner or operator of an affected facility shall construct a temporary total enclosure around the coating applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the Administrator is satisfied that the enclosure is totally capturing fugitive VOC emissions, then no additional total enclosure will be required for the performance test.

(3) Where compliance with the numerical limit specified in § 60.462(a)(2) is achieved through the use of higher VOC content coatings in conjunction with an emission control device that destroys VOCs, compliance is achieved when the value of the overall VOC destruction rate (E) is greater than or equal to the required overall VOC destruction rate (ER).

(f) Where compliance with § 60.462(a)(3) is achieved through the demonstration of a 90 percent overall reduction in VOC emissions, the owner or operator shall determine and record the actual overall VOC destruction rate using the equations provided in paragraph (e) of this section. Compliance with § 60.462(c) is achieved when the value of the overall reduction in emissions (E) is equal to or greater than 0.90.

(g) An owner or operator shall use the following procedure for each calendar month for each affected facility that uses a capture system and a control device that recovers VOCs (e.g., carbon adsorber) to comply with the applicable emission limit specified under §60.462(a)(2):

(1) Calculate the weighted average of mass of VOCs per volume of solids emitted after the control device with the following equation:

$$N = \frac{M_o - M_r}{L_s}$$

(2) If the weighted average of mass of VOCs per volume of solids emitted after the control device (N) is less than or equal to the applicable emission limit specified under § 60.462(a)(2), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this subpart.

§ 60.464 Monitoring of emissions and operations.

(a) Where compliance with the numerical limit specified in § 60.462(a)(1) is achieved through the use of low-VOC content coatings without the use of emission control devices, the owner or operator shall compute and record the average VOC content per volume of coating solids applied during each calendar month for each affected facility, according to the equations provided in § 60.463(c).

(b) Where compliance with the numerical limit specified in § 60.462(a)(2) is achieved through the use of higher VOC content coatings in combination with the use of an emission control device that destroys VOCs, the owner or operator shall compute and record for each affected facility the average VOC content per volume of coating solids applied during each calendar month, according to the equations provided in § 60.463(c).

(c) If thermal incineration is used, each owner or operator subject to the provisions of this subpart shall install, calibrate, operate, and maintain a device that continuously records the combustion temperature of any effluent gases incinerated to achieve compliance with § 60.462(a)(2) or (3). This device shall have an accuracy of ±2.5° C or ±0.75 percent of the temperature being measured expressed in degrees Celsius, whichever is greater. Each owner or operator shall also record all periods (during actual coating operations) in excess of 3 hours during which the average temperature in any thermal

incinerator used to control emissions from an affected facility remains more than 28° C (50° F) below the temperature at which compliance with § 60.462(a)(2) or (3) was demonstrated during the most recent measurement of incinerator efficiency required by § 60.8. The report required by § 60.7 shall identify each such occurrence and its duration. If catalytic incineration is used, the owner or operator shall install, calibrate, operate, and maintain a device to continuously monitor and record the gas temperature both upstream and downstream of the incinerator catalyst bed. This device shall have an accuracy of ±2.5° C or ±0.75 percent of the temperature being measured expressed in degrees Celsius, whichever is greater. The owner or operator shall record all periods during the coating operation in excess of 3 hours where the average difference between the temperature upstream and downstream of the incinerator catalyst bed remains below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or when the inlet temperature falls more than 28° C (50° F) below the temperature at which compliance with § 60.462(a) (2) or (3) was demonstrated during the most recent measurement of incinerator efficiency required by § 60.8. The report required by § 60.7 shall identify each such occurrence and its duration.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)

§ 60.465 Reporting and recordkeeping requirements.

(a) Where compliance with the numerical limit specified in § 60.462(a)(1) or (2) is achieved through the use of low-VOC content coatings without emission control devices or through the use of higher VOC content coatings in conjunction with emission control devices that destroy VOCs, each owner or operator subject to the provisions of this subpart shall include in the initial compliance report required by § 60.7 the weighted average of the VOC content of coating solids applied during a period of one calendar month for each affected facility.

(b) Where compliance with § 60.462(a) (2) or (3) is achieved through the use of an emission control device that destroys VOCs, each owner or operator subject to the provisions of this subpart shall include the following data in the initial compliance report required by § 60.7:

(1) The actual overall VOC destruction rate, and required overall VOC destruction rate used to attain compliance with § 60.462(a) (2) or (3); and

(2) The combustion temperature of the thermal incinerator or the gas temperature, both upstream and downstream of the incinerator catalyst bed, used to attain compliance with § 60.462(a) (2) or (3).

(c) Where compliance with § 60.462(a)(1) is achieved through the use of low-VOC content coatings without the use of an emission control device, each owner or operator shall report for each affected facility each month where the average VOC content of coatings applied exceeds the limits specified in § 60.462(a)(1). These reports must be submitted within 10 days after the end of each such month.

(d) Where compliance with § 60.462(a)(2) is achieved through the use of higher VOC content coatings and an emission control device that destroys VOCs, each owner or operator shall report for each affected facility each month for which the average VOC content of the coatings applied, when reduced by the destruction efficiency of the control device (as determined by the most recent measurement), exceeds the numerical limit specified in § 60.462(a)(2). These reports must be submitted within 10 days after the end of each such month.

(e) Where compliance with § 60.462(a) (2) or (3) is achieved by the use of a thermal incinerator, each owner or operator must report quarterly all periods in excess of 3 hours during which the average combustion temperature of the incinerator, as measured by the continuous monitor, remained more than 28° C (50° F) below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency. Where compliance is achieved with a catalytic incinerator, the owner or operator must report quarterly all periods in excess of 3 hours during which the average difference between the temperature upstream and downstream of the catalyst bed remains below 80 percent of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency and must report all periods in excess of 3 hours during which the average temperature upstream of the catalyst bed remains more than 28° C (50° F) below the temperature at which compliance was demonstrated during the most recent measurement of incinerator efficiency.

(f) Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall record daily the amount of solvent recovered by the system for each affected facility. The owner or operator shall report each month where the amount of solvent recovered by the system falls below that necessary for compliance. These reports must be submitted within 10 days after the end of each such month.

(g) Each owner or operator subject to the provisions of this subpart shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed.

§ 60.466 Test methods and procedures.

(a) The Reference Methods in Appendix A to this part except as provided under § 60.8(b) shall be used to determine compliance with § 60.462 as follows:

(1) Reference Method 24, or data provided by the formulator of the coating for determining the VOC content of each coating as applied to the surface of the metal coil. In the event of a dispute, Reference Method 24 shall be the reference method;

(2) Reference Method 25 for the measurement of the VOC concentration in the effluent gas stream entering and leaving the incinerator for each stack equipped with an emission control device, and for the measurement of the VOC concentration in each effluent gas stream emitted directly to the atmosphere;

(3) Method 1 for sample and velocity traverses;

(4) Method 2 for velocity and volumetric flow rate;

(5) Method 3 for gas analysis; and

(6) Method 4 for stack gas moisture.

(b) For Method 24 the coating sample must be a 1-liter sample taken at a point where the sample will be representative

of the coating as applied to the surface of the metal coil.

(c) For Method 25, the sampling time for each of three runs is to be at least 60 minutes, and the minimum sample volume is to be at least 0.003 dry standard cubic meter (dscm); however, shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(d) The Administrator will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Administrator that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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